## INSTALLATION & OPERATORS GUIDE

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEATURES &amp; CONTROLS</td>
<td>2</td>
</tr>
<tr>
<td>MOUNTING INSTRUCTIONS</td>
<td>2</td>
</tr>
<tr>
<td>TRANSFORMER SIZING</td>
<td>2</td>
</tr>
<tr>
<td>LOW VOLTAGE CABLE LENGTH</td>
<td>2</td>
</tr>
<tr>
<td>LOW VOLTAGE CABLE LAYOUT OPTIONS</td>
<td>3</td>
</tr>
<tr>
<td>CABLE CONNECTION DETAIL</td>
<td>3</td>
</tr>
<tr>
<td>OUTPUT ADJUSTMENT SWITCH</td>
<td>3</td>
</tr>
<tr>
<td>MULTI-TAP INSTALLATION</td>
<td>3</td>
</tr>
<tr>
<td>ACCESSORY TERMINAL CONNECTIONS</td>
<td>3</td>
</tr>
<tr>
<td>REMOTE PHOTOCELL CONTROL FUNCTIONS FOR RP MODULE</td>
<td>4</td>
</tr>
<tr>
<td>TC-112 TIMER SETTING PROCEDURE</td>
<td>4</td>
</tr>
<tr>
<td>DTC-170 DIGITAL TIMER SETTING PROCEDURE</td>
<td>4</td>
</tr>
<tr>
<td>TIMER REMOVAL &amp; REPLACEMENT</td>
<td>4</td>
</tr>
<tr>
<td>TIMER SETTING WITH FIELD INSTALLED PHOTOCELL</td>
<td>4</td>
</tr>
<tr>
<td>ELECTRONIC TIMER &amp; REMOTE PHOTOCELL</td>
<td>4</td>
</tr>
<tr>
<td>ADJUSTABLE CABLE RACEWAY FEEDER</td>
<td>4</td>
</tr>
<tr>
<td>TROUBLESHOOTING CHECKLIST</td>
<td>4</td>
</tr>
</tbody>
</table>

Made in the U.S.A.

UL 1838

Vista Professional Outdoor Lighting reserves the right to modify the design and/or construction of the fixture shown without further notification.
**FEATURES & CONTROLS**

1. **Stainless Steel Cabinet**
   20 gauge, domestic 304 stainless steel, polished & clear-coat finished.

2. **Take-apart stainless steel hinges**
   The door can be removed for greater access to wiring compartment during installation.

3. **Operating instructions inside door.**
   Refer to these instructions for additional information on wiring to the transformer.

4. **Magnetic overload circuit breaker**
   For reliable automatic secondary circuit protection. Circuit breakers may also be used as on/off rocker switches.

---

**TRANSFORMER SIZING**

Low voltage lighting systems require the use of a transformer to reduce the standard 120 volt power from ordinary household electricity to the 12 volt needed to power low voltage lamps. Transformers vary in size or capacity. The total lamp wattage (load) of all fixtures connected to one transformer must not exceed the wattage capacity of the transformer. Therefore, to determine the transformer size needed, simply add up the wattage of all lamps you plan to use +10% for cable & connection factor. (Low voltage cable and fixture connections add hidden watts to your system.)

TRANSFORMER SIZE = TOTAL FIXTURE WATT X 1.1

**TIP:** All low voltage connections must be tight and waterproof.

Select a transformer that matches as closely as possible your total lamp wattage. For example: if you have 12 fixtures all rated at 10 watts, you will need a 150-watt transformer (12 x 10 = 120 watts plus 10% = 132). If your total wattage is too great, either divide the total load between two transformers or use a more powerful model. Selecting a transformer with about 20% higher capacity than your total lamp wattage will allow for adding a fixture or two later.

---

**LOW VOLTAGE CABLE LENGTH**

In planning a low voltage system, it is necessary to consider the impact of voltage drop. Because of cable’s inherent resistance, voltage drops along its length: the end-of-run lamps will be dimmer than those at the beginning. Since voltage drop is a function of cable length and cable size and total fixture wattage, voltage drop can be minimized in several different ways:

---

**MOUNTING INSTRUCTIONS**

**WARNING:** Transformers must be installed in accordance with the National Electrical Code (NEC) and local codes. Failure to do so will void the warranty and may result in serious injury and/or damage to the transformer.

1. Find a suitable, flat-surfaced location to mount transformer, taking into consideration proximity to 120 volt AC power source.
2. Attach provided template to wall at desired height. (Should be mounted at least 1.5’ from the ground for safe and convenient operation.)
3. Center punch and drill (with an appropriate bit size for the screws to be used) at crosshair marks on the template.
4. Using appropriate screws for the selected mounting surface, insert screws into predrilled holes deep enough to slip transformer keyhole slots over. (Make sure screws are of a load bearing quality.)
5. Hang transformer case securely over screws.
- Use multiple cable runs
- Use heavier gauge cable (8 or 10 gauge)
- Shorten cable lengths or runs
- Reduce wattage of individual fixtures
- Reduce the total number of fixtures on a run
- Use multiple transformers in different locations

Cable is measured by gauge. The lower the number, the thicker the cable and the more current it carries. Cable for low voltage lighting is available in three gauges: #12-2, #10-2, and #8-2. As noted, #8-2 gauge is the largest and is capable of carrying the most current. Refer to the Cable Length Guide below to estimate the maximum allowable cable length that will keep the farthest fixture from the transformer from becoming too dim (below 10.5 volts). In addition, your transformer’s output options, the design of your lighting system and corresponding cable layout can help minimize voltage drop (see 12-Volt Cable Layout Options, Output Adjustment Switch, and Multi-Tap Installation sections).

**TIP:** Expect a voltage drop of greater than 1.5 volts when cable length is longer than recommended. Use the formula below to calculate maximum cable length.

$$V_d = \frac{L \times W \times 2}{Kc}$$

Where:
- $V_d$ = Voltage drop in the section of cable, in volts.
- $L$ = Length of the section of cable (one way distance), in feet.
- $W$ = Total Watts carried by the section of cable for the lamps it supplies.
- $Kc$ = ‘Cable Constant’, as follows:

<table>
<thead>
<tr>
<th>Cable Size (AW/G)</th>
<th>$Kc$</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>7500</td>
</tr>
<tr>
<td>10</td>
<td>11920</td>
</tr>
<tr>
<td>8</td>
<td>18960</td>
</tr>
</tbody>
</table>

**LOW VOLTAGE CABLE LAYOUT OPTIONS:**

**TIP:** Connect all lamps in parallel. **EXAMPLE:** Connect one side of each lamp to ‘COM’ terminal, the other side to ‘12V’ terminal.

1. Straight run installation: Fixtures run in sequence directly from the transformer.

   ![Diagram](https://via.placeholder.com/150)

2. Loop installation: Fixtures are arranged in a looped circuit, reducing the effects of voltage drop.

   ![Diagram](https://via.placeholder.com/150)

3. Split load installation or multiple cable run: Fixtures run in two or more directions from the transformer. Locating the transformer in the center of the run reduces the effects of voltage drop.

4. “T” installation (RECOMMENDED): Allows more equal distribution of power to the center of the run, or to a run some distance away. Cable running from the transformer must be of a heavier gauge (#8 or #10).

   ![Diagram](https://via.placeholder.com/150)

5. Multi-Tap transformers supply output voltage may exceed 12-volts; extreme care must be taken during installation to avoid premature lamp burnout due to high voltage. Use a voltage meter during installation to ensure proper voltage at the fixture. As a guide when designing your job, expect a 1-volt drop for every 100’ of 12/2 cable to which 100-watts of evenly spaced fixtures are connected.

   ![Diagram](https://via.placeholder.com/150)

   **CABLE CONNECTION DETAIL**

   **TIP:** For proper connection, strip off 3/4” of cable installation, twist wire strands tightly and use a high quality straight blade screwdriver 3/16” wide tip to tighten all screw terminals firmly.

   ![Diagram](https://via.placeholder.com/150)

**ACCESSORY TERMINAL STRIP: PHOTOCELL CONNECTIONS**

Vista photocell models FPC-160, FPC-170:

1. Disconnect transformer from 120V service.
2. Inside transformer, locate 120V accessory connector supplied from factory with 4” black jumper wire.
3. Using finger or small screwdriver, depress wire release lever firmly at cross.

   ![Diagram](https://via.placeholder.com/150)

   4. Keep lever depressed while removing black jumper wire from connector at positions marked “BLACK” and “RED”.
5. Install photocell on transformer enclosure per instructions, then locate three wires (WHITE, BLACK, RED) supplied with photocell (EXAMPLE: Model FPC-170).
6. Strip each wire ½” to expose wire strands.
7. Twist wire strands of each wire tightly.
8. Each connection point has 2 wire pockets. Either pocket may be used PER POSITION.

   ![Diagram](https://via.placeholder.com/150)

9. One wire at a time, match to connector position by color. Depress one wire release lever as before, inserting selected wire fully, then release lever. Perform a wire pull test to confirm connection.

   ![Diagram](https://via.placeholder.com/150)

Installation is complete – test by energizing transformer, setting any installed time switch to “ON”, then cover photocell “eye” completely with black tape. If low voltage lights come on within 5 minutes, your new photocell is functioning normally. Remove tape for normal operation.
REMOTE PHOTOCELL CONTROL FUNCTIONS FOR RPM-100 MODULES

If not already pre-installed, insert RPM-100 into the 120-volt accessory receptacle, then insert 120-volt accessory plug into RPM-100 module.

Photocell Mounting:
1. Disconnect transformer from 120V service.
2. Mount photocell eye where exposed to sunlight.
3. Run photocell cable with plug end back to transformer enclosure.
4. Locate square shaped hole in enclosure bottom and feed plug through to socket marked ‘PHOTOCELL INPUT’. Plug photocell in.
5. To test in daylight hours, apply input power to transformer and turn photocell control knob to desired setting.
6. Cover photocell eye completely so that no light enters. Transformer should turn on within a few seconds.
7. For normal operation, uncover photocell, turn knob to “OFF/RESET”, then to your desired setting.

NOTE: Turn photocell control switch to OFF/RESET any time you need to cancel a timed cycle. Next, move switch to your new desired on time. Time period will restart when dark.

Timer Setting:
Timer does not require time-of-day setting or battery backup maintenance. It depends on the photocell ‘darkness signal’ to begin the ‘on duration’ cycle. It has six modes of operation.

- By moving the dial to one of the four ‘on time’ switches (2,4,6,8 hours), you tell the unit to turn on at darkness, begin timing, and turn off when the selected time period ends.
- With dial turned to ‘DUSK TO DAWN’, the timer never activates, allowing the unit to operate from dusk until dawn.
- To test your system during daylight hours, use ‘ALL ON / TEST’ to override the photocell and turn the system on. Whenever input power is applied to the transformer, the lights will remain on.

The combination timer and photocell is designed for photocell-on, timer-off operation.

1. Insert TC-112 into the 120-volt accessory receptacle, then insert 120-volt accessory plug into TC-112.
2. To set time ‘ON’: Insert green tripper pin(s) into dial at the approximate start time(s) desired.
3. To set time ‘OFF’: Insert red tripper pin(s) into dial at the approximate stop time(s) desired.
4. Turn the outer rim of the timer face clockwise until the arrow on the view window points to the current time of day.

NOTE: The numbers on the timer face correspond to the hours in a day.

TIP: Refer to enclosed instructions (included with timer) for comprehensive operating instructions.

Initial Operation:
1. Plug the timer into the Transformer 120-volt accessory receptacle and turn the power on. Leave for approximately 14 hours to charge the memory back-up battery.
2. Clear all current information by pressing RESET button with sharp object such as a pen or pencil after charging.
3. Proceed with setting procedures for current time and programming.

TIMER REMOVAL AND REPLACEMENT

When so equipped, the timer supplied with your new transformer is a removable (plug-in) style. Located Inside the cover of the transformer enclosure, It can be pulled out and replaced with a new timer, remote photocell module, or remote control module. To replace a timer, simply grasp both sides of its plastic case and pull firmly. Next, remove the timer plug from the timer.

To install a new timer, Insert timer plug into timer before plugging into transformer’s timer receptacle.

TROUBLESHOOTING CHECKLIST

Although low voltage lighting systems operate with a minimum of maintenance, occasionally some problems will occur. Here are solutions to some of the most common problems.

I. Entire system will not operate
1. Check 120-volt outlet to ensure you have power to outlet.
2. Check or reset circuit breakers on transformer.
3. Check low voltage cable connection at transformer.
4. Check transformer alone by disconnecting low voltage cable from output terminals, by-passing timer and/or photocell as explained previously, and checking Input and Output power LEDs for power on status (lit).

II. System operates for 15 minutes, and then turns off
1. Timer incorrectly set. See setting procedure.

III. Circuit breaker on transformer trips
1. Check end of cable to ensure copper strands are not touching.
2. Check connection of cable at transformer to ensure copper strands are not touching.
3. Recalculate total wattage to ensure that you have not exceeded rated wattage of transformer.
4. Check for other shorts at fixture connection points.

If you have a concern or problem with any Vista product, first contact your local distributor. For continuing or unresolved problems, contact factory technical department at (800) 766-8478 between 8:00am and 5:30pm PST, Monday through Friday.